

ALTIMETER

2000

4050

4550

5125

5750

5990

6890

6920

7980

MANOMETER2000~~0~~

4000

4610

5150

5850

6000

6800

6900

8000



I. Pension (April 12)

Central arrows.

(corrected)

Small: appx. .5

Barometer

MANOMETER

Broad: exactly 6

6900 - 6920

Long: appx. 9.35

Insert. Between 29.8 and 29.9

Arrow inner ring: a little above 0

Arrow outer ring: .8

II. Upper Pasture (April 13)

Central arrows:

Small: appx. .6

6800 - 6889

Broad: 6.8

Long: appx. 6.178

Insert. 29.838

Arrow inner ring: .1

Arrow outer ring: .8



III Great Bevel

Central anows

Altimeter (corrected) ~~MANOMETER~~  
~~MANOMETER~~ ~~int~~

Small: 0.5

Broad: 5.75

Long: 7.22

IV Upper edge claus

Central anows

Small: 0.4

Broad: 5.1

Long: 1.25

5125' - 5150

V El Water

Central anows

Small: 0.4

Broad: 4.5

Long: 4.85

4550 - 4610

(The other indicators were the same at all 3 of these last stations)  
Anow inner ring: 0.08. Anow outer ring: 0.8. Dial: 29.8375.



Summit  
12,000 +

Mixed Flocks

(1)

October 4, 1960

Cerro Punta

Beginning work just below high pasture 6:50 a.m.

Group I. 2 Yellow-throats 2 Sooty caps 1 Black-checked W. 1 Wilson  
1 W. ♂ 1 Hummingbird.

1 Yellow-throat f. 1 Sooty cap f. 1 Wilson's leaving without  
C. f.

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2 ♂ Wilson's W. feeding about 20 feet apart. Apparently  
both quite isolated. Then one flies over to attack the other! This is why  
there is only one Wilson's per flock.

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Group II 1 Flame throat. 1 And. Flycatcher. 2 Collared Redstarts

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Group III. 3 Yellow-throats. 1 Wilson's W. 2 Black-checked W.  
1 Collared R.

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Wilson's W. always seems to be on the outskirts of mixed flocks.  
Extremely peripheral!

In Group III, the Black-checked W's definitely did not continue  
to go in the direction in which the Yellow-throats went.



Group IV 1 ♂ Wilson's W. 1 Eye-ringed Flatbill

1 Wilson's f → Flatbill.

Group I Same place - 2:20 pm.

3 Yellow-thighs 1 Yellow-throat

1 Yellowthroat f → Yellow-thigh

Group VI Above upper pasture.

2 Collared R., 1 ♂ Wilson's W., 1 Yellowish Flycatcher

It is obvious that the Collared Redstarts, the Wilson's Warblers, and some of the small flycatchers (and possibly the Flame-throated Warblers) are not nearly as closely confined to brush as the brush-tanagers and bush-finches. They will feed in and among isolated trees in the bare pasture, where the brush birds apparently never go.

Twice today (once above and once below the upper pasture) I have seen one or two Red Squirrels running around in the shrubbery near where mixed flocks of birds were feeding. Silent both times. But last March I remember watching a group of 3 squirrels, feeding in much the same area as a mixed flock of birds; and these squirrels were quite noisy - uttering harsh notes like CN's or ALCN's of some bush-finches (I think).

Perhaps the squirrel is really a member of these mixed flocks too.



# Murrelet Flocks

(3)

I have now seen a pair of Plate-throated Redstarts (up here, above the upper pasture!) feeding on the ground. One bare 6 ft.-wide trail.

I have been much surprised by how quiet all the murrelet flocks here seem to be now.

Group VII 3 Yellow-throats, 1 ♂ Wilson's W.  
Wilson's f → Yellow-throats

Group VIII 2 ♂ and 1 ♀ Wilson's W. (!!!), 1 Collared R, 1 Plate-throated R, 1 Black-checked W.

1 Collared R. f → Plate-throat R

Again saw Plate-throated R, feeding on ground, while Collared R fed just above ground.

Redstarts seem to be only noisy in flight now — when they utter loud "Tut" CN's.

Group IX 3 Yellow-throats, 2 Yellow-throats

1 Yellow-throat f → Yellow-throat

1 Yellow-throat f → Yellow-throat

Group X 2 Sooty caps, 1 Black-checked W, 2 Yellow-throats, 1 ♂ Wilson's W, 1 Plate-throat R, 1 Collared R, 1 unid. Wren

1 Sooty cap f →

1 Sooty cap b. f ←



1 Black-cheek j. —————> Yellow-thigh  
6 Yellow-thigh f. —————> Black-cheek

I have used the term "following" in this count in a rather different way from in our counts of the blue and green tanagers and honeycreepers. I have included following by hopping as well as by flying. And I have counted each following hop separately, as long as the successive hops were separated by an appreciable pause. The Yellow-thigh following the Black-cheek recorded above may be cited as an example. All 6 instances of following were really part of one reaction. The Black-cheek was moving rapidly through the bushes. The Yellow-thigh hopped after it, paused, hopped again, paused, etc etc etc etc.

October 1960  
Cerro Punta

In great bend area, 6:15 a.m.

Group I. 6 Brown-caps, 2 Buff-fronted Foliage-gleaners, 1 Silver-throat, 2 Yellow-thighs, 2 Chestnut-capped Atlapetes (!), 1 Slate-throated R

3 Foliage-gleaners j —————> Brown-caps

1 Silver-throat j —————>

5 Foliage-gleaners f. —————> Brown-cap

(The association of the Chestnut-capped Atlapetes with this flock was probably purely coincidental, just passing through.)

3 Yellow-thigh f. —————>

This flock seemed to form about 1/2 hour after dawn. Then it was active and noisy (i.e. the Brown-caps were noisy) for about 1/2 to



## Mixed Flocks

(5)

3/4 of an hour. Now (7:55 a.m.) the birds are largely silent and comparatively sluggish. I have great difficulty seeing the birds now, but I don't think the flock has actually broken up yet.

1 Yellow-thigh f. —————> Brown caps

1 Brown-cap f. —————> Yellow-thigh

1 Brown-cap f. —————> Yellow-thigh

Also 1 ♀ Yellow-faced Parakeet and a couple of humming birds in flock temporarily.

There was another burst of activity in the group around 8:15 a.m., but this quickly died down.

Group II 1 Blue Tanager, 1 ♂ Wilson's W.

1 Wilson's W. f. —————> Blue

Group III 2 Slate-throat R., 1 ♂ Wilson's W.

1 Wilson's W. f. —————> Slate-throats

It was quite noticeable that the 1 Blue Tanager mentioned above made no attempt to join the Brown-caps, although the latter were quite visible and audible about 100 yards away.

Group I (again) 1 Yellow-thigh f. —————> Brown Caps

I think the counts of Group I today do not give a really fair picture of the closeness of the association between the Yellow-thighs and the Brown-caps in this flock. The Yellow-thighs stick with the Brown-caps almost all the time. The counts of joining and following are so low simply because the Yellow-thighs are so difficult to see most of the time.



1 Pepper-shrike and 1 ♀ Wilson's W also joined the flock  
Also 1 Lufel-bellied Robin.

For the first time this morning I saw a pair of Black-checked Warblers down here. They were not with a mixed flock, however. (Although by the time I saw these warblers, ca. 9:55, the flocks had rather disappeared anyhow.)

One aspect of Group I this morning was rather surprising. The birds moved up and down, quite regularly, along approx 750 yds of road. They worked on both sides of the road, sometimes penetrating 50 yds or so into the brush, away from the road, but no more. They seemed to be following a regular route, going clockwise around an irregular oval. Again and again. They never strayed out of this area, although there did not seem to be any mixed flocks (or any other Brown-caps & themselves) on any side!

There were a few brief bursts of activity in the Group I mixed flock until about 9:15 a.m. separated by longer and longer intervals. And then the birds just disappeared. Presumably resting.

I am fairly certain that the 2 birds I have cited as "Buff-fronted Foliole-gleaners" above were indeed Phylloscopus rufus. It is just barely possible, however, that they were Anabacanthia variegaticaps or Cranioleuca erythrops. I must check with Shiras.

In any case, this pair of "Foliole-gleaners" was obviously very very strongly attached to the Brown-caps (probably even more so than the Yellow-throats). Stuck with the Brown-caps almost steadily. Followed them everywhere.

As a result of two days' observation here this trip, I am beginning to think that the mixed flocks here, like the mixed flocks on BCI, tend to be composed of 2 partly different associations. Here they are the warblers and



## Mixed Flocks

(7)

association (comparable to the honeycreeper association on BCI) and the bush finch and bush-tanager association (comparable to the tanager association on BCI).

One thing I forgot to mention above.... The Brown-caps were very noisy, this morning, when 5 or 6 of them were quite close together, and there was a lot of excited-looking flying back and forth. This flying back and forth was usually accompanied by lots of R. (I think these R's were only uttered in flight. In any case, they were the sort of R which always makes me think of "CN fill"s. Between flights + R's, the birds uttered only single CN's, or fairly slow series of 2 or 3 or 4 CN's. Mostly "Juck" CN's, I think.) I think these R's and flights must have been hostile. If so, there is still hostility within the flock, even in the middle of the non-breeding season. Interestingly enough, birds of other species seemed to be particularly likely to join and follow Brown-caps when they were flying about excitedly and uttering lots of R's. The intra-specific hostility of Brown-caps may be considered "attractive" to other species.

I think the mixed flocks here must be more highly developed than the blue and green tanager and honeycreeper flocks in the low lands. There are relatively more cases of overt following and joining here. And I have yet to see an inter-specific supplanting attack here!

The relationship between the Brown-caps and the Yellow-thighs is certainly not dependent on food. The Yellow-thighs often follow 20 feet behind, and 30-50 feet below the Brown-caps.

The foliage-gleaners, however, are usually right up there with the Brown-caps. So they may well get united disturbed by the Brown-caps.

2:55 p.m. Working just above the clavers



Group IV 6 Golden-crowned Warblers, 1 Slate-throat R, 1 Woodcreeper

1 Slate-throat R ♂ → Golden-crown W.  
1 Slate-throat R ♀ → Golden-crown W.  
1 Woodcreeper ♀ → Slate-throat R

Group V 5 Silver-throats, 2 Parula W., 1 Woodcreeper, 1 Pepper-shrike  
1 Golden-wing W., 1 Green Tanager, 1 hummingbird

1 Silver-throat ♂ → Parula  
1 Woodcreeper ♀ → Silverthroat  
1 Parula intra-specific fight  
2 Silver-throat intra-specific fights  
1 Golden-wing W. ♂ → Pepper-shrike

Group VI 2 Wilson's W., 2 Blue Tanagers, 1 Silver-throat, 1 Pepper-shrike, 1 Slate-throated R., 1 Bay-headed Tanager, 1 Black and white W., 1 White-winged Tanager, 1 Quarter Kiskadee, 2 Woodcreepers.

1 Blue ♂ → Bay-headed

Also a couple of Pale-bellied Robins in group

1 Blue ♂ →

1 Kiskadee supplanting Robin

(supplants)  
\*

It is obvious that down here we are getting very heterogeneous "open areas" mixed flocks, like the ones in young second-growth in the Corral Zone. It may be significant, therefore, that I saw my first inter-specific supplanting attack, and my first intra-specific contact fights, here in the flock this afternoon.

Although there are certainly Yellow-throated Atlapetes around here



re now, I have yet to see one of them in a mixed flock this afternoon (but I did see a pair following a mixed flock here on the afternoon of Oct. 3, the day I arrived). I think they probably join mixed flocks less frequently here, because Yellow-throats are absent from the area (and Brown-caps are relatively rare).

The Golden-crowned Warblers are very noisy when moving about. Uttering "Tut" calls, accelerating into a "W" call in flight. These notes are even louder and sharper than those of the Black-checked Warbler.

I think (but am not sure) that all the Woodpeckers I have seen this afternoon have been Spot-crowned Woodpeckers, *Lepidocolaptes affinis*.

Group II (Again). There was quite a heavy rain after my last observations recorded above, but it finally stopped ca. 3:30 p.m.

I then went back to Group II and found it still very heterogeneous.

By this time, at least 3 Brown-caps had joined the flock. They did not seem to be very "nuclear" in this flock. Other species were not reacting to them very frequently (I saw no definite cases of following or joining). I imagine that the Brown-caps were less "attractive" simply because there was too much "competition" around — especially the noisy Silver-throats and Golden-crowned Warblers. You could hardly hear the Brown-caps in the general din, and many of the other species in the flock were at least as restless as the Brown-caps.

October 6, 1960  
Cerro Punta

6:15 a.m. Working night at the level of Cerro Punta



Group I 3 Brown-caps, 1 Slate-throat, 2 Green Tanager

1 Tanager j → Brown-caps

Group II 2 Brown-caps, 3 Pale-vented Robins, 1 wood. flycatcher, 1 Yellow-thrasher, 2 Silver-throats, 1 Salitree, 1 Flame-colored T.

2 Robins j → Brown-caps

1 Robin f → Brown-cap

2 Robins supplanting Silver-throat

Group III 3 Brown-caps, 2 Yellow-throats, 1 Pale-vented Robin, 1 Wren, 1 Woodcreeper, 1 Ruddy-capped Nighthawk-thrush

1 Brown-cap j → Yellow-throats

This Brown-cap seemed to be attracted by a burst of WH among the Yellow-throats. When the Yellow-throats began WH, all the Brown-caps began SR, and one flew over to the tree in which the Yellow-throats were perched.

1 Wren j → Yellow-throats

1 Yellow-throat b j ←

A burst of SR-ing by the Brown-caps seems to provoke a burst of quite loud "Tuck" CN's by the Yellow-throats (who had been silent before). Then a general burst of calling by all the birds in the group, including the Woodcreeper.

Group IV 2 Slate-throats, 1 Wilson's W.

Group V 2 Brown-caps, 1 Silver-throat, 1 Collared R, 1 Flame-throated R, 1 Golden-wing W., 1 Queen Tanager, 1 Wilson's W, 2 Black and white



## Mixed Flocks

(11)

to W, 1 Blackburnian (?)

Group VI 2 Yellow-throats, 1 Black, 1 ♀ Wilson's W, 1 Black-chinned W

1 Black-chinned f → Yellow-throats  
1 Supplanting attack, ♂ Wilson's → ♀

Group VII 2 Yellow-throats, 1 ♂ Wilson's W, 1 Plate-throat R

1 Intra-specific fight between Yellow-throats

Group VIII 2 Yellow-throats, 6 Brown-caps, 2 Collared R, 2 Red-faced Spine-tails, 1 ♂ Diglossa, 1 ♂ Wilson's W, 1 ♀ Blackburnian

1 Yellow-throat f → Brown-caps  
1 Collared R. f →  
2 Pepper-shrike f → Brown Caps  
1 Yellow-throat f → Brown Caps  
1 Red-faced Spine-tail f →

I think, from my observations this morning, that the Yellow-throats are not really nuclear members of these flocks. More or less regular associates, more or less like the Sangres in the blue and green tanager and honeycreeper flocks.

Back in the same area 3.20 p.m.

Group IX (probably the same as VIII above) 2 Plate-throats, 1 Blackburnian, 2 Brown-caps, 1 Yellow-throat,



Group I (Probably partly the same as II above) 3 Silver-throats, 2 Brown-caps, 2 Slate-throats, 1 Blue T, 1 Green Tanager, 1 mixed flycatcher, 1 Wilson's W., 2 Pale-vented Robins

1 Robin supplanting Silverthroat

1 Robin intra-specific supplant (obviously hostile)

The Robin is certainly a most aggressive species. Obviously a disruptor in the mixed flocks. These particular robins seem to have a grudge against Silver-throats.

The Slate-throated Redstarts do not seem to be nuclear in these flocks. They are perhaps more often associated with mixed flocks than not, but they don't react to the other species very conspicuously, nor do the others react to them very conspicuously.

October 7, 1960

Cerro Punta

Working by great bend 6:15 a.m.

Group I (The same as Group I, Oct. 5) 6 Brown-caps, 2 Rufous-fronted Tanager, 2 Yellow-throats, 1 Wilson's W., 2 Silver-throats

7 Tanager glaucus f. —————> Brown caps

2 Brown Cap f. —————> Wilson's W.

3 Wilson's W. f. —————> Brown Caps

3 Yellow-throat f. —————>

2 Yellow-throat j. —————> Brown-caps

The white under sides of the wings of the Brown-caps are very conspicuous in flight and during WF's. Typical flash pattern



1 Silver-throat supplanting Brown-caps  
 Also 10+ Summer Tanager (full adult plumage) in flock, = 1  
 Pepper-shrike, 1 ♀ Red-headed Parrot

2 Yellow-throats f → Brown-caps  
 2 Foliage gleaners f →  
 3 Foliage gleaners f → Brown-caps  
 1 Foliage gleaner f →  
 1 Yellow-throat f → Foliage gleaner  
 1 Foliage gleaner f → Yellow-throat

This flock today seemed to essentially the same as the day before yesterday. A group of Brown-caps, "attended" by a pair of Yellow-throats and a pair of Foliage-gleaners. First became active around 6:30 or 6:45, and died by 7:00.

I saw a little more of the formation of the flock this morning. When I first arrived, I saw only a little group of approx. 3 Brown-caps, feeding actively but quietly. The Yellow-throats were moving about, some distance away from the Brown-caps. Apparently not part of the mixed flock yet, but heading irregularly in the general direction of the Brown-caps. Then, around 6:30-6:45 there was a sudden outburst of SR-ing among the Brown-caps. At this time, I noticed that there were at least 6 Brown-caps in the group. What I imagine happens is that the family parties of Brown-caps sleep separately, and only encounter one another some time after dawn. This particular flock seems to contain at least two family parties of Brown-caps. (I saw no signs of any birds "migrating" on territories here this morning.) At the same time that I heard the big burst of SR-ing among the Brown-caps, I saw that they had been joined by the Yellow-throats, the Foliage-gleaners, and the Wilson's Warbler. I imagine that the Yellow-throats and Foliage-gleaners just start to feed at dawn, and then attach themselves to the Brown-caps whenever they happen to run into them. If they haven't run into the Brown-caps before the latter begin their frequent SR-ing, then they must certainly join the Brown-caps.



as soon as the SR-vog begins.

The mixed flock today kept within the same boundaries as the day before yesterday, but its movements within these boundaries seemed to be somewhat more irregular today.

I know that there are Yellow-throats near the edge of this flock's range (if not actually inside the range). Why don't they join the flocks ???

The association of the Silver-throats with the flock this morning was very brief. When all the birds were feeding in the tree-tops. At this time, both the Silver-throats and the Brown-caps were particularly noisy — these 2 species do seem to stimulate one another's vocal powers. Also very active. But I could not really isolate any particular following or joining reactions. Although Silver-throats do sometimes come very low, within 2 or 3 feet of the ground, they seem to be primarily birds of the high tree-tops. They occur in high tree-tops more often than do the Brown-caps.

I wonder if the Pepper-shrike is a regular member of these flocks? A very inconspicuous species. But colored quite like the Brown-caps.

The Wilson's Warbler is literally peripheral. Almost always on the outskirts of the flock.

The Brown-caps certainly do not seem to have any special call which serves only to bring the flock together or keep it together. (Vide Johnson's description of the micropetrous flocks on BCI.)

Working in a new place. On Lewis's property, just above great bend.

2:05 p.m.

Group II 1 Empidonax flycatcher, 1 Slate-throat, 1 ♂ Wilson's W

Group III 1 Slate-throat, 1 Black-chick W, 1 ♂ Wilson's W, and 1 Wren



## Mixed Flocks

(13)

In addition to the loud CN's and CN-Hll's I have heard before, the Black-chalk Warblers also utter them "Treat" CN's (single or in short, not very rapid series). Apparently when not disturbed by me. Quite like the ECN's of Atlapetes spp. Merula?

Group III 2 Yellow-throats, 1 ♀ Wilson's W

1 Yellow-throat supplanting Wilson's  
1 Yellow-throat f → Wilson's  
1 Wilson's ♀ → Yellow-throats  
1 Wilson's f → Yellow-throats

Group I 2 Brown-caps, 1 Yellow-throat, 1 Imm or ♀ Imm, 2 ♂ Wilson's W., 1 Empidonax flycatcher

2 Wilson's W f → Brown cap

I wonder why the Wilson's Warblers are not followed or joined more? They are so noisy, active, and brightly colored. Perhaps because they only utter single CN's, no CN-Hll's? Or because they are usually single? (In this connection, it might be noted that the 2 Brown-caps in the group above usually worked far apart, and they seemed to be much less attractive than many other Brown-caps I have seen.)

October 8, 1960  
Cerro Punta

Working below upper pasture 6:30 a.m.

Group I 2 Yellow-throats, 1 ♂ Wilson's W.



## Mixed Flocks

16

I have twice now seen conspicuously active and noisy Sooty caps (once a single bird, once a pair) flying about without attracting any obvious attention from any other species.

I have also seen conspicuously noisy and active Black-chinned Warblers move around without being followed or joined.

There seems to be much less tendency to form mixed flocks here now than at lower altitudes. (Or is it just that the Brown-caps are much more attractive than anything here?)

Group II 1 Wilson's W., 1 Plate-throat

Group III 3 Yellow-throats, 2 Black chins, 1 ♂ Wilson's, 2 Cal. Wren R., 1 Pale-vented Robin, 2 Sooty caps, 2 Prong-billed Barbets

2 Black-chin f.

1 Yellow-throat j.

2 Yellow-throat j.

Yellow-throats

Sooty caps

The Sooty caps are remarkably silent at this time of year.

I think that the Sooty caps are maintaining territory, or at least defense to home ranges, here now. So, apparently, are the Yellow-throats. I have yet to see intra-specific fights in either species; but pairs & family groups seem to be well-represented.

The Yellow-throats now seem to have segregated out of the rest of Group III. Feeding on ground by themselves.

It is obvious of course that the Yellow-throats down below were also maintaining territories or home ranges (unlike the Brown-caps). Never more than 1 family party per mixed group.

Many of the Yellow-throats both here and down are going about in family parties of 3 (never more), consisting of 2 adults and 1 young. So this is def



||||~~||||~~ really not the breeding season for them (see today's notes on Pezomachus)

Group III (still)

1 Yellow throats

→ Colored R

2 Wilsons

A squirrel with the pack again!

1 Prong-billed Barbet }

2 Yellow-throats

1 Brown-bellied Parakeet f

Yellow - thrushes

1. Brown-capped Vireo also joins flock also brown birds

2 Brown cap Vireos

1 Collard R J

1 *Diglossa* in flock, and 1 *Solitaire*, and 1 *House-throat* W.

1. Diflora y

→ footcups

2 Coloured R. J

→ footy cap

1. Booty cap f

Yellow-thigh

1. Dosty cap 1

→ Solitaire

1 Green Tanager in flock now.

It seems obvious that there is no special relationship between the Yellow-throats and Sooty-caps here. The Yellow-throats will follow Sooty-caps, just as they will follow almost anything, but they do not seem to be "fixated" on Sooty-caps in the way they are on Brown-caps.

I think that the "partly independent" warbler association includes only the Redstarts (and possibly the Flame-throat), with the inevitable attendant Wilson's Warblers. It does not seem to include the Black-chicks, which are primarily birds of the interior of scrub.

October 9, 1960  
Cerro Punta



Working below upper pasture 9:30 a.m.

Group I 3 Yellow-throats, 1 Wilson's W

Group II 2 Sooty caps, 2 Collared R, 1 Wilson's W, 1 Green Tanager, 1 Yellow-throat, 2 Pygmytars, 1 Brown-capped Vireo

2 Collared R f → Sooty caps

2 Yellow-throats f →

1 Collared R f →

1 Brown-capped Vireo j →

5 Wilson's W f → Collared R

Also 2 Flame-throated Warblers in flock

1 Flame-throat j → Sooty caps

Also at least 1 Tree-creeper in flock, + 2 Lawrence's Cuckoo! and 2 Black-headed Woodpeckers. Also couple small flycatchers.

A squirrel with the flock again! Also 1 vireo, + 1 Flame-throated R.

I am fairly certain that the woodcreeper with this flock is Leptocolaptes affinis. It is staying with the flock very closely for quite a long time. (This may also be the species I saw with the flock just above the clausos a few days ago.)

1 Sooty cap j →

2 Collared R j →

I think that there is only one large flock in this whole area. Quite diffuse, splitting and re-joining in rather amorphous fashion. Possibly a few very small flocks (no more than 2 or 3 birds) are more or less separate most of the time.

Yesterday morning this flock formed rather late (after 7:30) and remained conspicuously active for quite a long time. This morning it formed earlier (very shortly after I arrived) and did not remain conspicuously active very



## Mixed Flocks

(19)

As far as I could tell, the formation of the large flock was a very casual process, both today and yesterday. The birds just drifted together. No "assembly" calls. Not even bursts of SR by footy caps.

There are quite a lot of ♀ and/or immature Blue-colored Tanager here. They seem to keep themselves quite distinct from mixed flocks most of the time.

1 Yellow-thigh j →  
1 Yellow-thigh j → footy caps  
1 Collared R. j → footy caps

October 10, 1960  
Cerro Punta

Same place c. 30 a.m.

Watching a pair of Black-chuck Warblers feeding by themselves for quite 10 minutes. Noisy. In an area which is often visited by the large mixed flock. And yet they were not followed or joined by anything! It certainly looks as if they are not unwanted! They didn't try to join anything else either. So I think this species may be classified as "occasional passive mixed in."

Group I 3 Yellow-thighs, 2 Black-chucks, 1 Brown-cap Vireo, 2 footy caps, 2 Wilson's W, 1 Slate-throat R., 2 Collared R.  
2 Black-chuck f. → Yellow-thighs

(There were not the Black-chucks which were not followed or joined earlier.)

1 Yellow-thigh j →  
1 Intra-specific fight between Wilson's Warblers  
1 Black-chuck j →



### 3 Wilson's W b

Two squawks with the flock again

Watching the front pair of Black-chicks again. Still not being followed or joined (although there are Wilson's Warblers, Flycatchers, and Yellow-throats, at least, in the neighborhood).

There is a family of 3 Yellow-throats here which has been moving about by itself for quite a long time now. It was associated with the large flock earlier this morning, but the warblers (and the footy caps) flew off, and the Yellow-throats made no attempt to follow.

It is my impression that, here and now, with the bush-indicator warblers and bush-tanagers (i.e. the Black-chick and the footy caps) being so relatively un-attractive, the Yellow-throats tend to segregate out from the mixed flocks quite frequently - much more frequently than last March here (and much more frequently than the Yellow-throats' lower-down now, where the Brown-caps are active and noisy).

I think that the relative un-attractiveness of Black-chicks and especially footy caps here now (compared with last March) must be due to the fact that they are less noisy now.

This indicates that noise, not color or movements, is the principal constituent of a species' attractiveness.

1 Collared R j

→ Plate-throat

1 Brown-capped Vireo j

→ Plate-throat

1 Plate-throat f

→

2 Wilson's W j

→

2 Tree creepers (same species as yesterday) also in flock



Mixed Flocks

(21)

January 8, 1961  
Rio Piedras

Beginning 7.00 a.m.

Group I 1 ♀ Yellow-Rump, 1 ♂ Yellow-Rump, 1 ♀ Tanager, 1 Palm  
Tanager

1 ♀ Tanager f → ♀ Yellow-Rump  
1 Palm j →

|||| ~~scribble~~  
The Palm in this group was feeding way down low, no more than  
1 foot off the ground in very thick scrub

Group II 1 ♀ Variable, 3 ♀ Yellow-Rumps, 4 Palms

1 ♀ Yellow-Rump j → Palm  
1 ♂ Yellow-Rump f → Palm

|||| ~~scribble~~  
Again, these Palms were very low

Group III 4 ♀ Yellow-Rump, 1 ♂ Yellow-Rump, 1 ♂ Tanager,  
1 ♂ Blue Black Grosbeak, 3 Plain-colored Tanagers (!), 2 Golden  
Masked Tanagers, 1 Blue Tanager, 1 Panama Wren, 1 Green-back  
1 ♂ and 1 ♀ Pro-Jordo

1 case ♀ Yellow-Rump definitely not being followed

1 Blue j → Plains

1 case ♂ Yellow-Rump definitely not being followed

1 Golden-mask j →

1 ♀ Yellow-Rump f → Green-back



In this last flock, the Blue Golden-crests - Plain group soon left the Rhamphocelus group. I E. the association between the two groups was purely "casual".

The Blues, Golden-crests, & Plains were, however, feeding quite low most of the time; rather like the Palms I saw with Yellow Rumps earlier.

I also saw a mixed flock of Blues and Golden-crests earlier this morning. They were feeding only moderately low, and kept quite apart from Rhamphocelus.

The Yellow-rumps certainly do not seem to be nuclear for any of the nuclear blue and green species!

also 1 Black-capped Saltator in group

Group IV 2 ♀ Variables, 1 ♀ Yellow-Rump

2 ♀ Yellow-Rump f → Variables

Group V 1 ♂ Variable, 1 ♀ Yellow-Rump, 1 ♂ Yellow-Rump

1 lone ♂ Yellow-Rump definitely not being followed

Group VI 1 ♀ Yellow-Rump, 1 Palm, 1 ♂ Variable, 1 ♀ Variable

There are really quite a lot of Yellow-rumps here today.

They are quieter, on the whole, than I expected. Quite silent, usually except when flying and/or disturbed by me.

They frequently occur in groups of 3-6, but apparently single



birds and pairs are not uncommon. They are just scattered all along the edges of the river. Not all divided into discrete flocks.

I have been surprised by how few other birds follow Yellow-rumps. Also by how frequently they follow other birds.

It is easy to imagine that the Yellow-rumps could become a much rarer species in other circumstances. Here they seem to be prevented from becoming nuclear by 2 factors. 1. They cannot be passive nuclear because other species don't react to them. 2. They cannot be really active nuclear because few or none of the other species in the region are as closely confined to river edges. (Yellow-rumps also tend to stay lower in the vegetation than most other tanagers.)

I have seen very few fowls here, too few to determine how they are reacting to the Yellow-rumps. It may be significant, however, that the few fowls I have seen have all been associated with Yellow-rumps.

November 18, 1960

Rio Piedras

8:00 a.m.

Group I 4 ♀ Yellow-rumps, 1 ♂ Yellow-rump, 1 Clay-colored Thrush,  
1 ♀ Summer Tanager, 2 Green-backed Sparrows, 1 ♂ Banded Ant-  
shrike

3 cases ♀ Yellow-rump not being followed  
1 case ♂ Yellow-rump not being followed

Group II 4 ♀ Yellow-rumps, 2 ♂ Yellow-rump, 1 ♀ Black-billed seed-  
finch, 1 imm. ♂ Euphonia (Boo Boo?), 1 Buff-throat Saltator  
5 cases ♀ Yellow-rumps not being followed



1 imm ♂ Euphonia j →  
 2 imm ♂ Yellow Rumps not being followed

Group III 2 ♀ Yellow Rumps, 1 Pelu Tanager, 1 Buff-throat Saltator

or

1 Buff-throat j →  
 1 ♀ Yellow Rump f → Buff-throat

Group IV 4 ♀ Yellow Rumps, 2 ♂ Yellow Rumps, 1 Golden-mask Tanager, 1 ♂ Fulvous-vent Euphonia, 1 ♀ Sangre

1 ♀ Sangre j → Yellow-Rumps  
 1 Golden-mask j → Yellow-Rumps  
 1 ♂ Fulvous-vent j → Yellow-Rumps

I was again impressed, today, by how remarkably infrequently the Yellow Rumps are joined and followed — especially in view of their extreme conspicuousness. At least 80% of all the Yellow Rumps I saw today were not associated with mixed flocks in any way.

The few Sangres I saw today were staying low in the shrubbery even more consistently than the Yellow Rumps. (Yellow Rumps do go quite high in trees with some appreciable frequency.)



①

MIXED FLOCKS — QUITO REGION

May 19, 1962,  
Near Kono

This morning I saw a whole group of birds feeding and moving in a thicket along the ravine. Including at least 4 fraseri coubells, 4 Firebellies (2 obviously forming a pair, the other 2 rather scattered), a pair of Thraupis olivi-cyanus, at least one Diglossa sterreana, one bird that looked very much like a Rufous-fronted Tanager-gleaner, various hummingbirds, and probably some other stuff.

For a while, it looked very much as if the Firebellies were playing a passive nuclear role. They were repeatedly followed by the coubells, and the 2 species, in turn, were followed by the olive-cyanuss. But then the Firebellies moved further on, into some trees, and were not followed again. The whole group seemed to disperse in an unobtrusive way.

The Firebellies (being very conspicuous) may be as attractive as possible to birds of other species, without having developed any special mechanisms especially designed to attract birds of other species, and without being the object of any special inter-specific preferences.

I have yet to see any signs of an active nuclear species here



RE INTER-SPECIFIC REACTIONS — QUITO

May 23, 1962  
Noro

There is a species of Myioborus here. ♂'s & ♀'s apparently identical. Quite remarkably similar to Atlapetes rufinucha, except for yellow eye-ring and white patches on tail.

Always in pairs (at least now)

Feed in eucalyptus trees, at same levels as Diglossopus. Looking for insects in the same way. Also feed in scrub, in same areas as Diglossopus, D. atrovirens, and (probably) Corurostrum. As far as I know, do not feed on flowers or nectar.

Must be an important competitor of Diglossopus (at least)

Does not fly catch like the Chingui redstarts (presumably there are no suitable flies here).

Utters lots of "Tut" "CN"s. Sometimes accelerated like "Tut"s of Diglossopus. Perhaps utters "Tuk"s as well.

Song quite like that of D. atrovirens, but probably more "warbling", and usually or always ending with a distinct "Tazeezee".

Ignores and is ignored by Diglossopus — even when feeding within a few inches of the latter.



Intra-specific Fights Cero Punta

Parula W. 1

Silver-throat 11

Wilson's W 11

Yellow-throats 1

Pale-bellied Thrush 1



Supplanting Cero Punta

Kiikadee → Pale-bellied Thrush 1

Pale-bellied Thrush → Silver-throat III

Silver-throat → Brown-cap 1

Yellow-throat → Wilson's W. 1



Eisenmann, E. (1937) "The birds of the province of  
Bocas del Toro, Panama" —  
Condor 39, p. 247-262

Sporophila torqueola and S. aurita cooccur  
associating together. Also Volatinia.

Jusson, L. (1932) "The distribution of bird life  
in Guatemala" — Bull. Amer. Mus.  
Nat. Hist. 84

Volatinia nearly always in company with  
Sporophila

Wetmore, A. (1943) "The birds of southern  
Veracruz, Mexico" — Proc. U.S. Nat.  
Mus. 3164, vol. 73, p. 215-340

Sporophila torqueola and Volatinia  
in association



*Catamenia aialis*

*Catamenia viornata*

*Catamenia homochroa* ♂ Pale yellow bill Rufous  
under tail-coverts Much lighter  
than plebejus.



# David's Notes

## Joining

- 1 Brown cap —————> Yellow-thigh
- 2 Sooty cap —————> Yellow-thigh
- 1 Yellow-thigh —————> Slate throat
- 1 Yellow thigh —————> Brown cap
- 1 Yellow thigh —————> Sooty cap
- 1 Yellow throat —————> Yellow thigh
- 2 Silver-throat —————> Brown cap
- 1 Speckled —————> Silver-throat
- 1 Flame throat —————> Silver-throat

## Following

- 3 Yellow-thigh —————> Sooty cap
- 1 Yellow-throat —————> Flame throat

## Supplanting

- 1 Red headed Parakeet —————> Baywing T.



Intra specific Feeds

Brown-cap 3  
Sooty cap 1  
Yellow-thr 2



①

March 8, 1959. Cerro Punta.

GENERAL COMMENT ON THE MIXED  
SPECIES FLOCKS I HAVE SEEN NEAR  
HERE ON THIS TRIP.

In general, mixed-species flocks are conspicuous for their absence here now. The only common mixed flocks we have seen are based upon the two redstarts, especially the Hite-throated Red-start. And tanagers are seldom or never associated with such flocks now.

The nearest thing we have seen to a mixed flock involving tanagers or finches are a few associations of several species feeding in the same trees or bushes for more or less brief periods. Such associations are probably purely "casual".

Yellow-thighed Finches and Yellow-throated Atlapetes are often feeding near together in the same hedges in the whole area from approx. 5000 ft to approx. 7000 ft.

We once saw Yellow-thighed Finches associated with a flock based upon Black-checked Warblers in a forest above 7000 ft.

Down in the sub-tropical forest, between 4000 and 5000 ft, we once saw a few Brown-capped Bush-tanagers, Silver-throated Tanagers, Wilson's Warblers, and Tanager Warblers, feeding in the same trees and moving about more or less together for a short time.



March 10, 1959  
Cerro Punta

### ADDITIONS

Since writing the above a couple of days ago, I have been watching one or more mixed flocks in second-growth scrub & light forest at the 17000 (appr.) ft. level. Band on Collared Redstarts always including 1 or 2 or more Wilson's Warblers and at least 1 pair of Yellow-striped Finches. Sometimes including Yellow-throated Atlapetes, Sooty-capped Bush-tanagers, Slate-throated Redstarts, Flame-throated Warblers (Yerrewora gutturalis), Black-checked Warblers (Basileuterus melanogenys), and a Ruddy Tree-sucker. The Collared Redstarts obviously controlling the direction of the movements of the flock.



July 11, 1959 Cerro Campana

# MIXED "FEEDING ASSOCIATIONS" HERE.

On this trip here, I was surprised to find large groups of several species of tanagers here. All more or less feeding together in the same trees; and occasionally (at least) most of the birds moving in the same direction, eventually; but this sort of association seems to be much looser than the Plain Tanager flocks on Barro Colorado, or the Brown-capped Bush Tanager and Collared Redstart flocks at Cerro Punta.

There do not seem to be any really "nuclear" species in the "feeding associations" ("FA's") here now; although all the groups I have seen so far have included at least Silver-throated & Bay-headed Tanagers and Tawny-capped Euphonia. But the birds in these FA's seldom or never flew off together, one right after the other, as the Plain-Blues - Palms may do on BCI.

It may be significant, in this connection, that although many of these species are quite noisy, giving a lot of CN's, they none of them utter as many CN's as the nuclear species of other flocks I have watched.

I have also seen quite a number of other species associated with the FA's here from time to time today. Among these were Black and Yellow Tanagers (1 pair, for quite some time), Blue Tanagers (1 pair, for a short time), a single ♂ Green Honeycreeper (for a short time) and a single ♂ or a pair of Hepatic Tanagers (for a short time).



(4)

March 20, 1960 Cerro Punta.

MIXED FLOCKS, 7000 ft AND ABOVE

We have only been watching flocks fairly high up the mountain. At these altitudes mixed flocks are still common, apparently not dissolved by the approach of the breeding season.

Almost every flock we have seen here, at these high altitudes, has included several Collared Redstarts, one pair of Yellow-throated Todies, one or more Wilson's Warblers, and a single bird or a pair of Scott's Capped Bush-tanagers. Probably also a pair of Yellow-throated Atlapetes in almost every flock, and one or more birds of one or more species of Dendrocolaptes. At the highest levels, one or more Black-chested Warblers are also closely associated with almost all flocks. Slate-throated Redstarts, Rose-throated Warblers, and even Diglossas, are sometimes associated with the flocks, but they seem to be less common and/or more independent at all these relatively high altitudes.

(Note: Collared Redstarts are not common now at relatively low altitudes where they were common during March of last year; and I have yet to see Rose-throated Warblers quite as low as I did last year.)

March 21, 1960 Cerro Punta.

MIXED FLOCKS, 7000 ft AND ABOVE.

I don't think my comments yesterday were very penetrating.



We have actually been observing 2 kinds of flocks.

Below the pasture, the flocks are essentially composed of Yellow-thighed Tanager, Yellow-throated Atlapetes, Sooty-Capped Bush-tanagers, and Wilson's Warblers. Plus miscellaneous other things from time to time, of course. (Today we even saw a Pyropeutes more or less associated with a flock below the pasture)

Above the pasture, Collared Redstarts & Black-chinned Warblers become "regular" members of the flocks (along with other things as usual).

Among the definite positive social reactions we have seen in these flocks were the following: 1 case of a Sooty-Capped Bush Tanager following a pair of Yellow-thighed Bush Tanagers. 1 case of a Wilson's Warbler following a pair of Sooty-Capped Bush Tanagers.

MIXED FLOCKS, 6000 ft OR LOWER.

Today we saw a pair of Silver-throated Tanagers join, and twice follow, a flock of 4 or more Brown-capped Bush-tanagers.

March 22, 1960. Cerro Punta

MIXED FLOCKS, 6000 ft OR LOWER

Today we saw a most interesting flock, quite low, almost at the upper edge of the "clouds".

It was composed of the following birds: at least 3 Brown-



Capped Bush-tanagers, 1 pair of Spurred Tanagers, 1 ♂ Scarlet-thighed Tanager, 1 ♂ Wilson's Warbler, 2 Blue Tanagers Definite by moving about together. The only special social reaction we noted was one instance of a Spurred Tanager chasing away the Dacnis when the latter got too near.

In the same area, at approximately the same time, were at least 2 (and probably more) Silver-throated Tanagers, and 1 Slate-throated Redstart.

This group would appear to have been a mixture of a highland mixed flock and a lowland mixed flock. (It may be significant, in this connection, that it has been raining hard all along the upper part of Cerro Punta and the volcano almost steadily since yesterday afternoon. The rain has been much less lower down, near the station. So perhaps the highland flocks have been moved downward.)

March 29, 1960. Cerro Punta.

### ALL MIXED FLOCKS HERE

Although we haven't been able to see much in the way of mixed flocks here this trip, a few things seem to be clear.

The principal constituent of the flocks is the Brown-Cap — Yellow-thigh relationship or the Footy Cap — Yellow-thigh relationship. This seems to form the nucleus of all the really large and conspicuous flocks.

One or two Wilson's Warblers usually follow each flock. They might be considered "parasites", except for the fact that their loud CN's may increase the attractiveness and cohesion of the flock as



a whole.

We have seen few or no obvious cases of Wilson's Warblers following or joining other individual birds in mixed flocks. All or most Wilson's Warblers just seem to drift along in more or less the same general direction, at approximately the same speed, as any particular flock they happen to be associating with at the time.

The Yellow-throated Bush Finches are even more "parasitic" than Wilson's Warblers, as they contribute much less to the general movements of a mixed flock. At this season, at least, the Yellow-throats are always in pairs, and there is never more than one pair per flock. It is also barely possible that the Yellow-throats perform more "special" following reactions than the Wilson's Warblers.

(The roles of the tree-keepers associated with mixed flocks may not be very different from that of Wilson's Warbler and/or that of the Yellow-throats. The Pranga totanus also behave in a somewhat similar way.)

(The behavior of Black-checked Warblers in relation to mixed flocks is discussed in today's notes on Pauleuterus.)

We have not seen enough Redstarts associated with flocks here this trip to be able to add anything to my previous notes.



May 23, 1961

Cerro Pichincha, near Quito

On previous years, I got the impression that mixed flocks of 9. primaried songbirds did not occur here.

During my observations this year, however, I have seen a few mixed flocks. Including almost anything: Atlapetes rufinucha, Drylona sternina, the local "Hemipicus", Thraupis lionhearti, the Black-nested Warbler (Basileuterus nigrocrinitus), and a local species of furnariid (rather Myioborus-like in shape — essentially rufous all over, lighter below, probably with a dark streak through the eye). But I still think that such flocks are usually purely casual aggregations (see below for the one conspicuous exception).

It may be significant that none of the species listed above show much intra-specific gregariousness.

It may also be significant that mixed flocks were much more conspicuous this evening than at any other time I have watched birds here. It was very foggy this evening, with nearly constant drizzle.

The local redstart (Myioborus melanocephalus ruficollis) is definitely not part of the mixed flocks here. It stays up in the trees most of the time, while the mixed flocks are usually in moderately low shrubbery and hedges.

The only very distinct inter-specific relationship I have noted was between Atlapetes rufinucha and the local furnariid described above. This evening a pair of the furnariids seemed to be following a pair of the Atlapetes, quite steadily, (when the birds were undisturbed).



	Mr. Gulls	Mr. Gulls	Yellowing	Severus	Being yellowed	Being yellow
Black-chest W				 6		6 12
Golden-crown W		1		0	1	1 2
Heads-thrust R				1 3		 5
Callard R				 12		6 18
Red-forked Yellow-green				 22	1	1 23



[illegible]



## POSSIBLE CASES SOCIAL MIMICRY

- I Large conspicuous tyrant flycatchers of Central American region. Bright yellow breasts, striking black and white stripe pattern on breast. Species of the genera Megarhynchus, Pitangus, Myiozetetes. References: SUTTON, G. M., (1951), "Mexican Birds", Univ. Okla. Press, Norman, Okla. STURGIS, B. B. (1928), "Field Book of Birds of the Panama Canal Zone", J. P. Putnam's Sons, N.Y. - London.

## PARTLY SOCIAL MIMICRY?

- I Supposed examples of Mullerian or, more probably, Batesian Mimicry. The Black Drongo, Dicrurus adsimilis, and a black flycatcher, Melanerpes formicivorus. I saw birds and ovids. Reference: SHEPPARD, P. M. (1958), "Natural Selection and Heredity", Hutchinson & Co., London.



HUXLEY, J.S. (1938) "Threat & warning coloration in birds, with a general discussion of the biological functions of color" — Proc. 8th Int. Orn. Congr., Oxford, p. 430-455

Use of word "episemantic"

Also stresses the fact that the same color pattern may subserve several different functions.

FRIEDMANN, H. (1935) "Bird societies" — from "A Handbook of Social Psychology", Clark Univ. Press, Worcester, Mass., U.S.A., pp. 142-184

General survey of sociability in different groups

———— (1950) "The breeding habits of the Weaverbirds. A study in the biology of behavior patterns." — from the Smithsonian Report for 1949, Smithsonian Inst., Washington, pp. 293-316

General survey, Philetornis particularly useful example

WING, L. (1946) "Species association in winter groups" — Auk 63, p. 507-510



## GENERAL REFERENCES

COTT, H. B. (1946) "The edibility of birds: illustrated by five years' experiments and observations (1941-46) on the food preferences of the hornet, cat and man; and considered with special reference to the theories of adaptive coloration." — *Proc. Zool. Soc. London* 116, pts 3 and 4, pp. 371-524.

States that "conspicuity" is a factor reducing vulnerability. (see also Mottram)

Also mentions that black & white are the most conspicuous of all colors.

MOTTRAM, J. C. (1915) "The distribution of secondary sexual characters amongst birds, with relation to their liability to the attack of enemies." — *Proc. Zool. Soc. London* 1915, p. 663-678.

### More Notes from Cott.

"Flash colors" are "proeisematis" according to Huxley, 1934 and 1938.

White color of sea-birds. Called "syneisematic" by ~~Armstrong~~ Cott

ARMSTRONG, E. A. (1946) "The coloration of sea-birds" — *Birds of Britain*, 2, p. 15-19.



DARLING, FF (1952) "Social Behavior and Survival" — Auk 69, p 183-191.

Lets some advantages of gregarious feeding and communal defense against predators.

CONDER,



## SOME ADAPTATIONS INVOLVED IN THE DEVELOPMENT OF GREGARIOUS HABITS

A bird usually reacts to the presence of other birds by showing several contradictory and more or less "incompatible" tendencies. It is often partly hostile and partly "friendly", apparently wanting to join the other birds, and also attack them and/or escape from them at the same time. The resolution of such conflicting reactions is a particularly difficult problem in highly gregarious species, which have had to devise methods of both increasing the general social or flocking tendencies and controlling the hostile responses which are provoked by any close association of different individuals, (it seems to be very difficult, i.e. very disadvantageous, to dispense with hostility altogether). Most gregarious species have evolved specialized adaptive behavior patterns in order to attain both objectives.

The patterns which help to promote flocking are usually obvious and relatively simple. Almost all the highly gregarious species have developed special social calls, conspicuous wing and/or tail movements, and (very frequently) increased general mobility or "restlessness", all of which seem to be designed to increase the attractiveness of a social group and maintain cohesion within it. Some gregarious species have developed such characters without greatly altering the "hierarchy of instincts"; but others have also evolved a special, and more or less independent, "general social" drive or instinct which is not found in more solitary species.

The control of hostile responses would seem to be a more complicated matter in some respects, and has been achieved by a greater variety of methods. Some species have evolved special displays (ritualized social signals) which may be used by one bird of a group to reduce the strength of the internal attack and/or escape drives of other members of the group, while other species have developed displays which help to divert the overt expression of hostility within the group into relatively harmless channels. The overt expression of hostility may even be reduced without the intervention of special displays, by directly reducing the response to certain particular types of hostile stimuli (without weakening the internal hostile drives in general). Some species may use different methods in different circumstances; and these variations would also seem to be adaptive, in some cases at least, as they can be correlated with particular factors of the external environment.



## SCHEMATIC ADAPTATIONS INVOLVED IN THE DEVELOPMENT OF GREGARIOUS HABITS

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## CLASSIFICATION

As there seems to be some evidence that Diglossa may be related to Certhia, I have looked at several species of Conebills in the USNM. The plumage of the ♂'s of some Conebills is surprisingly bright, with considerable black and/or iridescent blue, although the actual patterns are not particularly reminiscent of any Flower-piecers I know. (There seems to be considerable sexual dimorphism in all or most of the species of Conebills in which the ♂'s are brightly colored. The ♀'s tend to be much duller.)

Below are descriptions of the brightly colored ♂'s of 3 species of Conebills:

1. sitticolor Black head & throat, blue back, rufous breast and belly.

2. albifrons Generally black, with a white forehead, and blue on the back and upper wing-coverts.

3. atrocyaneum. Generally black, with blue on crown, back, scapulars, and upper wing-coverts.



## Gregarious

Relatively little aggressive

Hostility actually reduced

A relatively large proportion of hostility expressed by display

Relatively few distinct types of display

Some special types of displays (i.e. mimetic)

## Non-gregarious

Relatively aggressive

Hostility not reduced

A relatively smaller amount of hostility expressed by display

A relatively large number of distinct types of display

Few or no special types of display



## CLASSIFICATION

The Tanager, as a whole, would seem to fall into the following major groups:

I Euphoniae Quite distinct

II Blue and Green Tanagers. Usually, but not always, with some bright (frequently iridescent) blue or green in plumage. Also frequently black. Sometimes bright red or yellow. Very few species with dull plumage. Sexes apparently always essentially identical.

Tanagra

Chlorochrysa

Piprida

\* Tangara

Iridoprocne

Dolichopteryx

Stephanothraupis

\* Poecilothraupis

Bangsia

Buthraupis

\* Dulcisia

Coupsocoma

\* Thraupis

Chlorornis?



(2)

III Red and Yellow and Black Tanagers. Much more varied, although less successful, than the Blue & Green Tanagers.

The typical members of this group are brightly colored, with large areas of red, orange, yellow (and, less frequently, white), usually contrasted with black. In almost all these species, there is strong sexual dimorphism, the ♀'s being noticeably duller than the ♂'s.

There are also a few members of this group in which both sexes are dull, usually grayish or olive, and identical with one another. They might be considered "hen-feathered" species.

None of the species in this group has bright blue or green in the plumage.

In addition to the more or less typical members of the group, there are a number of other, more or less aberrant, species which may be attached to it.

A. Typical Members of the Group.

Spinulales

\* Rhamphocelus

\* Piranga

Phlogothraupis

Calochaetes

Chlorothraupis

\* Halia.

B. Almost Certainly Members of the Group

Lanio

\* Tachyphonus

Heterospingus

Eucometis



- \* *Rhodinocichla*
- \* *Mitrospingus*
  - Calyptophilus*
  - Phaenophilus*
  - Merospingus*
  - Compsothraupis* ?
  - Sericospiza*

IV Honeycreepers Quite another problem!

V Warbler & Finch-like Tanagers. Probably extremely miscellaneous

- \* *Chlorospingus*
  - Cremasopus*
  - Merospingus*
  - Neothraupis*
  - Hemitraupis*
  - Chrysothlypis*
  - Erythrothlypis*
  - Thlypopsis*
  - Pseudospingus*
  - Microspingus*

VI Very problematical genera. Also obviously miscellaneous

- Cyanicterus*
- Orthogonyx*
- Georgops*



(4)  
Malacothraupis

Trichothraupis

Cypsuaga

Pyrrhocomma

Hemosia

Prothraupis

Conothraupis

Taupospiza

Orchesticus

Oreothraupis

Schistochlamys

\* Cinopus



Regular Prairie Nuclear Species

Plain-colored Towhees

Regular Active Nuclear Species

Palm Towhees

Blue Towhees

Green Herons

Regular Anomals

Blue Jays

Summer Towhees

Occasional Prairie Nuclear Species

Red-bellied Blue Herons

Barn Swallows ?

Occasional Anomals

Canyon Cuckoo Towhees ?

White-bellied Towhees ?

Euphonias

Saltators



Regular Paucic Nuclear Species

Brown-capped Bush-tanager

Regular Acute Nuclear Species

Yellow-thighed Titch

Wilson's Warbler

Collared Redstart ?

← ? footy cap.  
Black-chuck W.  
Golden-crown W.

Regular Associates

Rufous-fronted Foliole-gleaner

Other Tamarind ?

Toucanet ?

Yellow-throated Bush-Titch

Plate-throated Redstart

Summer Tanager ?

Robin ?

Occasional Associates

Yellow-throat

Speckled Tanager ?

Flame-throated Warbler ?

Pepper-shrike

Brown-capped Vireo

Green Toucanet

Orange-billed Parrot ?

Flame-colored Tanager ?

?

✓

✓

✓



Description of supposed Rufous-bellied Tanager

Forehead rufous

Back of neck (= crown?) grayish

Light streak behind eye

Generally buffy underneath

Tail and wings (not rump) bright rufous



Mixed Flocks

Isla del Rey  
June 2, 1967

Arrive ca 7:30 a.m.

Lots of BB Granguits, several streaked Saltators, one juv. or ♀ Sangre seen almost immediately.

8:00 a.m. Lots more Sangres. A large party of RLBH's (at least 3 ♂'s and 3 ♀'s). And more streaks. Not really associating with one another, altho all in same area.

8:05. First BT seen. Alone but in same area.

Some BG's around

1:00 p.m. I have still to see any PT's or PCT's around. The absence of PT's is particularly surprising, as there are lots of Coco and other palms around.

As a result of the absence of these 2 nuclear species, there are no "real" mixed flocks around. Lots of associations between different species, but all seem to be purely "casual".



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## MIXED SQUIRREL-BIRD FLOCKS

Mountains above El Valle - Sept 8, 1962. A large mixed flock of birds, including ant-birds and at least one tree-creeper. With a reddish squirrel (perhaps the usual lowland Red-tail) near the center. Birds obviously not mobbing the squirrel.